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ABSTRACT

This paper reports the findings of a study that explored the validity of curriculum-based measures of reading in order to develop a valid and practical instrument for regular education teachers as well as special education teachers in Korea. Participants in the study were 213 students from 7 elementary schools in Seoul, Korea. Of the total, 183 second-grade students were placed in the regular classrooms, 30 students (grades 1-6) with Individualized Education Programs (IEP) for reading were also from the special classes. Testing materials consisted of four different tasks: oral reading tests, question-answering tests, a maze procedure, and a standardized reading comprehension subtest. In general, the results revealed that the reliabilities of the reading inventories were adequate. The scores of the oral reading tasks showed greater correlations with the criterion measures than those of the rest of the reading inventories. In addition, the oral reading measures produced a substantial discrimination (regular education students/students with reading IEPs). The subsequent analyses also revealed that the oral reading measures provided much higher validity coefficients for the students with reading IEPs. Charts illustrate statistical results. (Contains 24 references.) (Author/CR)

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# Assessing Reading Performance with Curriculum-Based Reading Inventories: The Case of Korea

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Abstract

The purpose of the present study was to explore the validity of curriculum-based measures of reading in order to develop a valid and practical instrument for regular education teachers as well as special education teachers in Korea. Testing materials consist of four different tasks (oral reading tests, question-answering tests, maze procedure, and a standardized reading comprehension subtest). In general, the results from this study revealed that the reliabilities of the reading inventories were adequate. The scores of the oral reading tasks showed greater correlations with the criterion measures than those of the rest of the reading inventories. Additionally, the oral reading measures produced a substantial discrimination(regular education students/students with reading IEP). The subsequent analyses also revealed that the oral reading measures provided much higher validity coefficients for the students with reading IEP.

# Assessing Reading Performance with Curriculum-Based Reading Inventories: The Case of Korea

It has been believed that learning disability (LD) is more or less a Western problem and even the term "LD" was just introduced in 1980's. However, many evidences were found that learning disabilities, especially reading disabilities, also exist for Korean Children. In Korea, some special education professionals have solely relied on standardized, norm-referenced measures as the basic tool for identifying students with learning disabilities, and others have mostly depended on the clinical judgements without any formal tests. However, standardized testing instruments are being challenged because they are: (1) unreliable and invalidated for the purpose of determining which children are with mildly handicapping conditions and should be placed in mildly handicapped classes; (2) not adequate for measuring change or learning since the measurement is infrequent; (3) of only minimal value in instructional planning, particularly day-to-day decision making about the instructional needs of children (Ysseldyke, Thurlow, Graden, Wesson, Algozzine, & Deno, 1983).

An inspection of special education literature of the past decade readily shows the popularity of curriculum-based assessment (Heshusius, 1991; Wesson, 1991). Curriculum-based assessment(CBA) is the practice of obtaining direct and frequent measures of a student's performance on a series of sequentially arranged objects derived from the curriculum used in the classroom (Blankenship & Lilly, 1981). This alternative system incorporates three key features: (1) test stimuli are drawn from students' curricula; (2) repeated testing occur across time; and (3) the assessment information is used to formulate instructional decisions (Tucker, 1987).

CBA is the generic term for procedures that students' skills in students' actual curricula. It encompasses a variety of models; most models of CBA build on informal, nonstandardized procedures (Potter & Wamre, 1990). Curriculum-based measurement, however, is an empirically derived, standardized form of CBA developed by Deno and his colleagues at the University of Minnesota Institute for Research on Learning Disabilities (IRLD) from 1977 to 1983. The primary goal of the IRLD was to formulate reliable and valid measurement and evaluation procedures that teachers could use routinely to make decisions about whether and when to modify a students' program. The utility of CBM within such a formative evaluation process is to provide

practitioners with an improved data base on which they can lay their judgements. CBM has been applied to several academic areas (e. g., reading, math, spelling, and written expression).

On the basis of research studies on developing and validating reading measures conducted by the Minnesota IRLD, the number of words read aloud correctly in one minute was primarily used for the unit of measurement. Reliability of the reading aloud measure has been investigated. Interrater reliability ranged from .96 to .99 (Deno, Marston, Mirkin, Lowry, Sindelar, & Jenkins, 1982). Test-retest reliability for equivalent forms was at .90 or greater (Fuchs, Deno, & Marston, 1983). Criterion validity has been assessed by correlating CBM reading scores with standardized reading test performance. Reported correlations between reading aloud and scores on standardized tests typically fall between .70 to .90, with most coefficients above .80 (Deno, Mirkin, & Chiang, 1982; Deno, 1985; Fuchs & Deno, 1981).

To sum up, CBM is not the only way of measuring general reading proficiency, but it has several advantages (Deno, 1985; Kim, 1993). First, the measurement procedures are brief, allowing for repeated sampling with concomitant increases in the reliability of student performance. Second, measurement material is taken from the student's own curriculum so problems of content validity are minimized. Third, because the measures are brief, local norms could provide an estimate of reasonable expectancy for eligibility decision making. Fourth, the measure provide technically adequate as well as time and cost-effective assessments of student performance. Fifth, student progress over time is usually displayed visually, which provides clear and effective means of communicating student performance to parents and special education related professionals of widely varying background and experience. Sixth, the measure are more sensitive to improvement in student achievement than published achievement tests. Seventh, the measures are highly sensitive to growth under short-term treatments, which allows the validations of changes made in instructional programs in the least restrictive environment. Eighth, the use of these measures in a formative manner can lead to significant and positive achievement gains for special education students and can increase the degree of instructional structure and effective teaching practices.

In Korea, special education has mainly dealt with students who are blind, deaf, mentally retarded, physically handicapped. Students with learning difficulties have usually been left unidentified. Learning disability has appeared as a fairly new handicap

category in Korea in the past few years. The current learning disability identification practices are largely based on classroom teacher informal observation of student academic performance and verification of the disabilities in terms of deficient performance on some diagnostic devices. The validity of such an identification process is unknown. If a system of measurement similar to CBM has developed in Korea, it could be used by teachers to collect information and make reliable and valid decisions about their students with mild learning handicaps. A critical task to be considered when developing such a system in Korea is to identify relevant tasks that can be measured routinely and that will validly index progress in the curriculum.

The purpose of this study was to explore the validity of curriculum-based measurement procedure of reading in order to identify measures that are valid and practical for regular education teachers as well as special education teachers in Korea. More specifically, the criterion validity of the reading aloud measures in association with different reading inventories was investigated.

## Method

### Subject/Setting

The participants in this study were 213 students from 7 elementary schools, Seoul, Korea. 183 students (2nd graders) were placed in the regular classrooms. 30 students with reading IEPs, ranged from grade 1 to grade 6, were also from the special classes. The number of students by grade can be seen in Table 1. The subjects consisted of 120 boys (56.3%) and 93 girls (43.7%).

### Measures

The instrument used in this study consisted of four different tasks (oral reading measures, an question-answering test, a maze procedure, and a standardized reading comprehension subtest), and teachers' rating.

#### Oral Reading Measures

Two oral reading passages were selected. Oral reading measure 1 was from "First grader's Story" (1134 syllables, 368 words, 29 paragraphs). Oral reading measure 2 (1110 syllables, 391 words, 34 paragraphs) was a part of a story from "Learning and Thinking for Third and Fourth graders" (KEDI, 1991). The reading measure was identified as counting the number of syllables a student read correctly for one minute.

Considering the characteristics of Korean letters, syllables instead of words in this study was employed as the basis for indicating oral reading performance. Since the oral reading measures were individually administered, both student and the examiner had copies of the passages. To simplify the scoring, the examiner's copy included the cumulative number of syllables at the end of each line. Subjects were required to read aloud each passage until the examiner said to stop. Student's performance (numbers of syllables read correctly) was reported. Omissions, substitutions, mispronunciations and insertions were not included in the score.

Maze

The reading probe was from a story book(second grade level) in which a word in seven-word-unit has been deleted. In place of the deleted word a multiple choice array containing the deleted word and two incorrect alternatives. Performance on the reading is scored by counting the number of correct multiple choices (23 questions for 3 minutes). The sample question is as followings:

ex) After raining, the (raincoat, rainbow, umbrella) appeared in the sky.

Question-Answering Measure

The reading probe was also chosen from a second grade level story book. There were nine questions answered by recalling the previous reading passage. Students had to read the passage for 2 minutes and answer the questions for 3 minutes.

Reading Comprehension

The 3-minute Reading Comprehension Test consisted of 15 items and was a part of a standardized reading test, the Reading II subtest (Reading Comprehension) of Basic Academic Skills Test (BAST). In this test, students choose a correct picture among four alternatives after they read each sentence.

Teacher Rating

Three teacher ratings were provided to assess the student's reading performance. Teacher rating 1 was the teacher's judgement of overall reading ability of the student. Teacher rating 2 was the teacher's judgement of reading comprehension ability and teacher rating 3 was the teacher's judgement of reading fluency level. Teacher ratings were scored by the each student's home-room teacher, ranged from 1 to 5.

Procedure

The reading instruments were administered to 213 students in the 7 participating elementary schools over a 2-week period. The individually-administered measures (two

oral measures, and three teacher ratings) were provided to 50 regular education students and 30 special class students with reading IEP by trained graduate students. The reliability coefficients of the two oral reading measures were .99 by inter-rater agreement among 5 raters.

## Results

Table 1, 2 and 3 displays factor analyses (principal component) and reliability coefficients (internal consistency) of three reading measures. These three measures (Question-Answering: QA, Maze, Reading Comprehension subtest: RC) seems to be unidimensional and have adequate reliabilities (.78, .89 and .82 respectively).

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Insert Tables 1, 2, and 3 about here

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The scores from the reading measures (Oral Reading measures, Question-Answering measure, and Maze measure) were correlated with the criterion measures (Reading Comprehension subtest, Teacher Rating on Overall Reading Performance, Fluency, and Comprehension, Educational Status). In Table 4, for overall students, scores of the oral reading measures (1 and 2) showed greater correlations with the Reading Comprehension subtest and teacher ratings (.70-.80) than Question-Answering and Maze (.54-.72). Additionally, the oral reading measures produced substantial Educational Status discriminations (regular education students/students with reading IEP). The correlation coefficients between oral reading measure and Educational Status ranged .58-.60, whereas the relationships between the rest of the reading measures and Educational Status were .30-.49. The correlation coefficient between two oral reading measures is .96 and means and standard deviations are similar, which indicates a high parallel form reliability in oral reading.

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Insert Table 4 about here

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The correlations among the reading measures and criterion measures, for 50 regular class students, are presented in Table 5. Oral reading measures 1 and 2 are strongly related with Reading Comprehension subtest (.66 and .58) and Teacher Ratings (.42-.58).

The Maze also shows a good criterion validity with Reading Comprehension subtest (.63) and Teacher Ratings (.42-.52). However, the correlations between Reading Comprehension subtest and Question-Answering (.44) is somewhat lower than those of oral reading tests.

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Insert Table 5 about here

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The correlations for special class students have similar a tendency as the above. The correlation coefficients of both oral reading measures with Reading Comprehension subtest reveal over .70 (.70-.72), which are higher that those of Question-Answering and Maze (.66). Interestingly enough, the variabilities (means and standard deviations) of oral reading measures are also higher than those of the rest of the reading measures. This variability indicates that oral reading seems to be much more sensitive to the change for students with reading IEP.

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Insert Table 6 about here

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## Discussion and Conclusion

The purpose of the present study was to explore the validity of curriculum-based measures of reading in order to develop a valid and practical instrument for regular education teachers as well as special education teachers in Korea. Testing materials consist of four different tasks (oral reading tests, question-answering tests, maze procedure, and a standardized reading comprehension subtest). Except for the standardized test, reading inventories were constructed and their reliabilities were investigated. The scores from the reading measures were correlated with the criterion measures (Educational Status, Standardized Reading Test: Reading Comprehension, Teacher Rating on Overall Reading Performance, Fluency, and Comprehension). In general, the results from this study revealed that he reliabilities of the reading inventories were adequate. The scores of the oral reading tasks showed greater correlations with the criterion measures than those of the rest of the reading inventories.

Additionally, the oral reading test produced a substantial discrimination (regular education students/students with reading IEP). The subsequent analyses also revealed that the oral reading measures provided much higher validity coefficients for the students with reading IEP.

Reading aloud from text is face-valid as a measure of decoding-the internal process of translating written text into language. Comprehension, on the other hand, is defined as creating meaning out of what is written (Eldredge, 1988; Moore & Kirby, 1988). Despite this distinction, these two are highly interrelated across grade levels (Shinn et al., 1992). The result is that decoding is an essential skill but also a broad indicator of reading achievement (Chall, 1983; LaBerge & Samuels, 1974; Snider & Tarver, 1987; Wilson & Flemming, 1940). In the reading development model, Chall (1983) pointed out that students with severe reading difficulties have problems in Stage 1 or 2. It may be years before students with severe reading difficulties are fluent with easy materials. According to LaBerge and Samuels (1974), mature readers view reading as a holistic process because their subskills are automatic. Yet, students with reading difficulties may struggle to learn and reach automaticity on word recognition and decoding. LaBerge and Samuels (1974) have speculated that as the decoding process becomes increasingly automatic, rapid, and fluent, then more attention can be freed for the task of comprehension. Readers who take too much time to decode words may forget many of the words they read at the beginning of a passage and thus have difficulty comprehending the material. This is consistent with the literature showing that decoding fluency increases with age and reading ability (Potter & Wamre, 1990). Even though the ability to decode words does not assure complete and accurate performance on an performance measures of comprehension, creating meaning from text cannot take place without adequate decoding skills (Eldredge, 1988). As Potter and Wamre (1990) pointed out, the research by Deno and his colleagues focused on determining the degree of the empirical association between various reading performance measures rather on testing or developing conceptual model.

In the United States, estimates of the incidence of children with reading disabilities can range from a low of 3% to a high of 40% (Sheidan, 1983), most of them are between 5% and 10%. The Cross-National Study of Children's Reading, which was conducted by Stevenson and his colleagues in the University of Michigan, in cooperation with collaborators in Japan and Taiwan, was purposed to validate the widely held claim

that children learning to read Japanese and Chinese writing systems did not evidence reading disabilities as their American counterparts did (Stevenson et al., 1982). The researchers found the strong evidence that reading disabilities exist among Chinese and Japanese as well as among American children. In the same vein, a substantial number of students in Korea suffer some academic difficulties due to a lack of reading proficiency.

The CBM reading measures can be constructed easily and be more relevant in Korea, because the Korean letters, just as English, are not ideogram (Chinese) but phonogram. This study provided an empirical basis for the selection of an appropriate database in establishing effective formative evaluation system for Korean elementary teachers to implement in their classrooms. The results also confirmed major findings from the Fuchs' research (Fuchs et al., 1988). Thus, the next step will be developing a continuous monitoring system for students with reading IEP, considering the similarities and the differences between the English CBM system and the Korean counterpart.

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Table 1

Principal component anaysis and reliability: Question-Answering measure

| items | factor loadings | internal consistancy if item deleted | reliability coefficient (internal consistancy) |
|---|---|---|---|
| item1 | .59 | .76 | .78 |
| item2 | .40 | .78 | |
| item3 | .55 | .76 | |
| item4 | .74 | .73 | |
| item5 | .62 | .76 | |
| item6 | .76 | .73 | |
| item7 | .35 | .78 | |
| item8 | .66 | .75 | |
| item9 | .68 | .74 | |

Table 2

Principal component anaysis and reliability: Maze

| items | factor loadings | internal consistancy if item deleted | reliability coefficient (internal consistancy) |
|---|---|---|---|
| item1 | .38 | .89 | .89 |
| item2 | .40 | .89 | |
| item3 | .37 | .89 | |
| item4 | .33 | .89 | |
| item5 | .34 | .89 | |
| item6 | .50 | .88 | |
| item7 | .34 | .89 | |
| item8 | .41 | .88 | |
| item9 | .58 | .88 | |
| item10 | .64 | .88 | |
| item11 | .70 | .88 | |
| item12 | .73 | .88 | |
| item13 | .75 | .88 | |
| item14 | .59 | .88 | |
| item15 | .76 | .88 | |
| item16 | .70 | .89 | |
| item17 | .56 | .89 | |
| item18 | .52 | .89 | |
| item19 | .69 | .89 | |
| item20 | .66 | .89 | |
| item21 | .66 | .89 | |
| item22 | .54 | .89 | |
| item23 | .61 | .89 | |

Table 3

Principal component anaysis and reliability: Reading Comprehension subtest(BAST)

| items | factor loadings | internal consistancy if item deleted | reliability coefficient (internal consistancy) |
|---|---|---|---|
| item1 | .40 | .82 | .82 |
| item2 | .44 | .82 | |
| item3 | .43 | .82 | |
| item4 | .65 | .81 | |
| item5 | .59 | .81 | |
| item6 | .61 | .81 | |
| item7 | .69 | .81 | |
| item8 | .69 | .80 | |
| item9 | .64 | .81 | |
| item10 | .59 | .81 | |
| item11 | .58 | .81 | |
| item12 | .63 | .80 | |
| item13 | .41 | .82 | |
| item14 | .40 | .82 | |
| item15 | .03 | .83 | |

Table 4

Correlation Coefficients and Descriptive Statistics (Oveall, n=213)

| Correlations | x1 | x2 | x3 | x4 | x5 | x6 | x7 | x8 |
|---|---|---|---|---|---|---|---|---|
| Oral Reading1(x1) | 1.00 | | | | | | | |
| Oral Reading2(x2) | .96** | 1.00 | | | | | | |
| Question-Answer (x3) | .70** | .69** | 1.00 | | | | | |
| Maze (x4) | .71** | .71** | .57** | 1.00 | | | | |
| Reading Comprehension Subtest (x5) | .80** | .76** | .54** | .62** | 1.00 | | | |
| Teacher Rating 1 Overall (x6) | .70** | .71** | .66** | .69** | .65** | 1.00 | | |
| Teacher Rating 2 Comprehension (x7) | .72** | .72** | .64** | .67** | .66** | .90** | 1.00 | |
| Teacher Rating 3 Fluency (x8) | .73** | .73** | .68** | .72** | .69** | .91** | .85** | 1.00 |
| Educational Status (x9) | .60** | .58** | .49** | .47** | .39** | .63** | .55** | .65** |
| Descriptive | | | | | | | | |
| Mean | 181.23 | 182.24 | 4.45 | 7.89 | 8.98 | 3.34 | 3.00 | 3.14 |
| SD | 82.86 | 87.32 | 2.41 | 4.64 | 3.11 | 1.37 | 1.28 | 1.36 |

Note: Educational Status (indicator variable) coded 1=regualr education, 0=special class.

$p<.01$* $p<.001$**

Table 5

Correlation Coefficients and Descriptive Statistics (Regular Education Students, n=50)

| Correlations | x1 | x2 | x3 | x4 | x5 | x6 | x7 | x8 |
|---|---|---|---|---|---|---|---|---|
| Oral Reading1(x1) | 1.00 | | | | | | | |
| Oral Reading2(x2) | .91** | 1.00 | | | | | | |
| Question-Answer (x3) | .33 | .33 | 1.00 | | | | | |
| Maze (x4) | .55** | .57** | .34 | 1.00 | | | | |
| Reading Comprehension Subtest (x5) | .66** | .58** | .44** | .63** | 1.00 | | | |
| Teacher Rating 1 Overall (x6) | .42* | .50** | .32 | .42** | .30 | 1.00 | | |
| Teacher Rating 2 Comprehension (x7) | .58** | .61** | .36* | .48** | .43** | .84** | 1.00 | |
| Teacher Rating 3 Fluency (x8) | .53** | .58** | .34* | .52** | .41* | .81** | .77** | 1.00 |
| Descriptive | | | | | | | | |
| Mean | 219.60 | 221.46 | 5.52 | 9.66 | 10.26 | 4.00 | 3.54 | 3.82 |
| SD | 60.15 | 64.75 | 2.13 | 5.19 | 2.62 | 1.05 | 1.11 | 1.00 |

$p<.01$* $p<.001$**

Table 6

Correlation Coefficients and Descriptive Statistics (Special Class Students, n=30)

| Correlations | x1 | x2 | x3 | x4 | x5 | x6 | x7 | x8 |
|---|---|---|---|---|---|---|---|---|
| Oral Reading1(x1) | 1.00 | | | | | | | |
| Oral Reading2(x2) | .97** | 1.00 | | | | | | |
| Question-Answer (x3) | .74** | .77** | 1.00 | | | | | |
| Maze (x4) | .65** | .64** | .50** | 1.00 | | | | |
| Reading Comprehension Subtest (x5) | .72** | .70** | .66** | .66** | 1.00 | | | |
| Teacher Rating 1 Overall (x6) | .65* | .62** | .57 | .73** | .66** | 1.00 | | |
| Teacher Rating 2 Comprehension (x8) | .61** | .57** | .58** | .66** | .64** | .89** | 1.00 | |
| Teacher Rating 3 Fluency (x8) | .58** | .54** | .56** | .66** | .63* | .89** | .80** | 1.00 |
| Descriptive | | | | | | | | |
| Mean | 117.27 | 116.87 | 1.53 | 2.43 | 6.00 | 2.23 | 2.10 | 2.00 |
| SD | 76.27 | 81.32 | 1.87 | 2.94 | 3.54 | 1.10 | 1.03 | 1.08 |

$p<.01$* $p<.001$**